MC-Kmeans: an Approach to Cell Image Segmentation Using Clustering Algorithms

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Abstract

Digital image processing has been a fundamental tool for the diagnostic and treatment of diseases. Several techniques have been used to analyze microscopic images in cell-level processes. Different methods for the segmentation task are recognized for its contribution in the image processing. Nevertheless, not all are useful in the studies at a microscopic level. In most of the biomedical images, cells are visually clustered and this makes that, simple and fast algorithms which are used in the other cases, may fail. This research proposes the development of a segmentation algorithm in HEp-2 cells type, using the marker-controlled watershed and k-means methods. This approach achieves an improvement in the cell segmentation, which allows obtaining effective information in the posterior analysis. We obtained a precision of 82.3% in the performance and in the qualitative analysis the method reached an outstanding performance in comparison with the other segmentation techniques used in the experiments. Finally, we concluded that the algorithm proposed, is suitable for the segmentation of the studied cells.

Keywords

Marker-controlled Watershed, k-means, cell segmentation, digital image processing.